

Complexity, Networking, and Effects-Based Operations...

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Boeing

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Outline

- 1. Three why's and a what**
- 2. Operations in the Cognitive Domain and Beyond**
- 3. Complexity**
- 4. Implications for Network Centric Operations**
- 5. Second Generation Network Centric Operations**

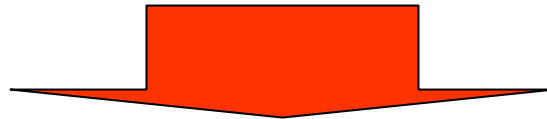
1. Three Why's and a What

Why #1: The Challenge of Asymmetric Niche Competitors

Symmetric, State-to-State Conflict

Opponents have similar means and will

Great Means	}	vs.	}	Great Means
Great Will				Great Will



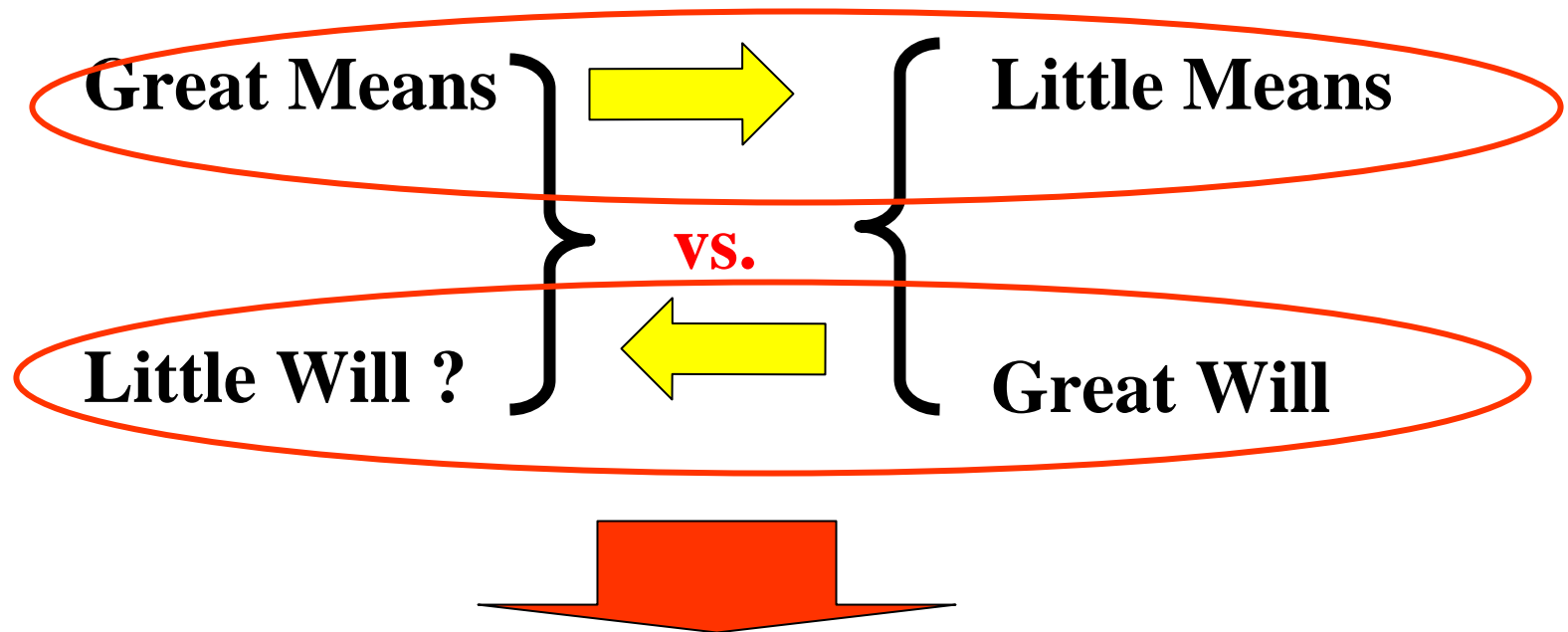
Physical Attrition

Asymmetric Niche Competition

Opponents have unequal means and will

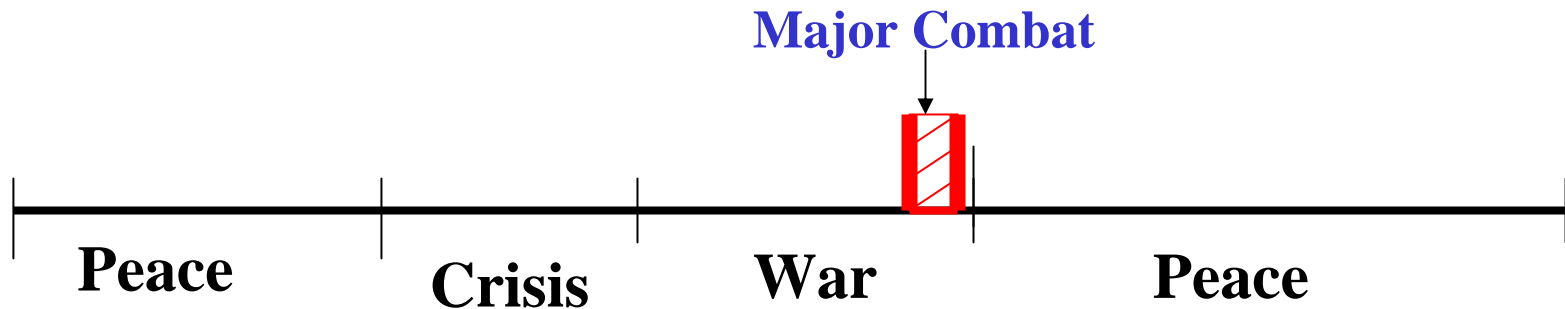
Large Power

Challenger

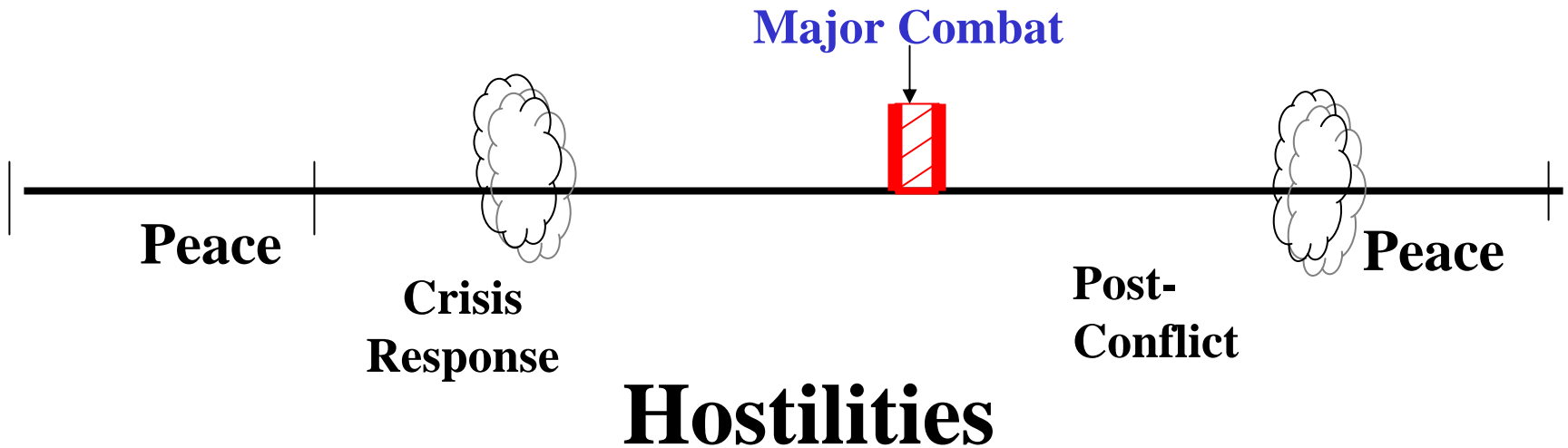


Psychological Attrition

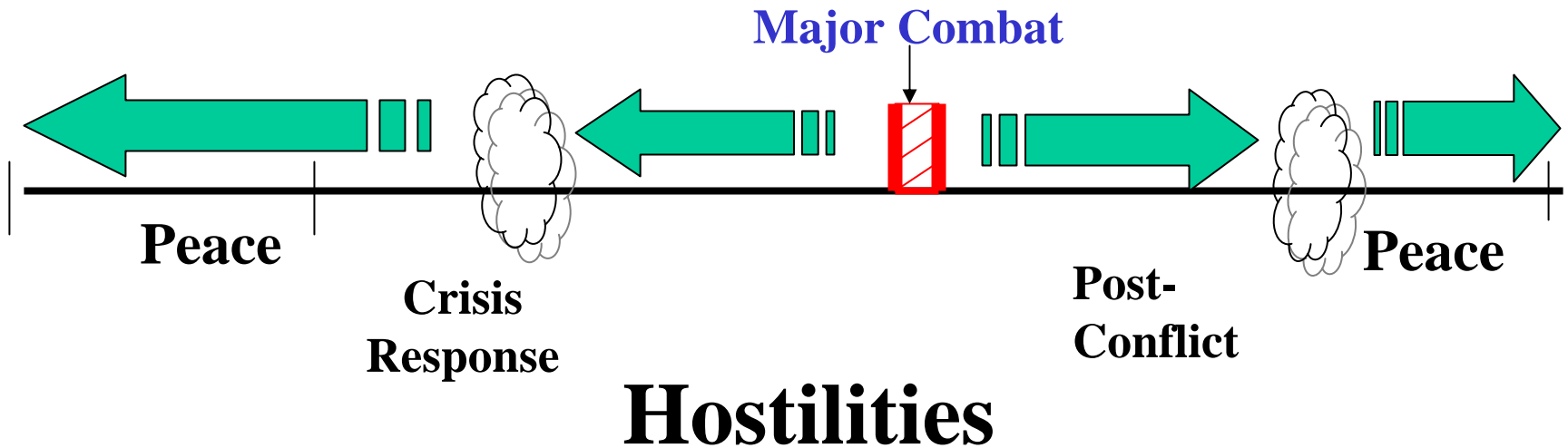
Why #2 : Spectrum of Military Operations



New Security Environment



Implications



- *Increasing human dimension*
- *Increasing complexity*
- *Increasing “whole of nation” effort*

Why #3: “Real” World Operations

- **Industrial Age: Physical Attrition**
 - Engagements
 - Right targets, weapons, numbers, time, but...
 - Enemy adapts:
 - Non-uniformed combatants
 - Mixed with civilians
- **Information Age: Psychological Attrition**
 - Right actions, right timing, right effects
 - Complex situation
 - No civil-military separation, human shields
 - Multiple audiences
 - Foe seeking media “effect”
 - Interaction on-going
 - No beginning or end
 - Peace, crisis, war, post war, peace continuum

The What

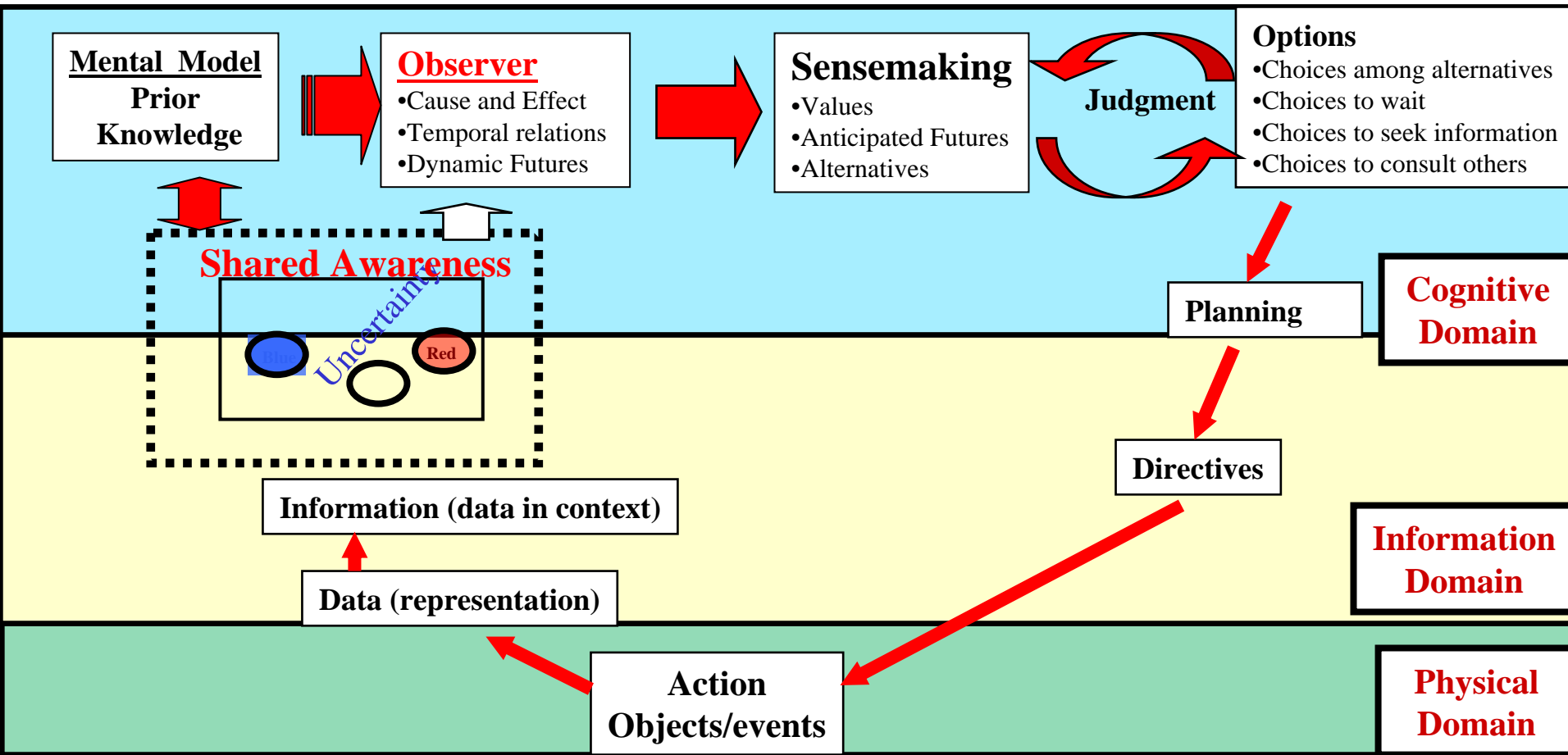
Effects-Based Operations:

*Coordinated sets of actions
directed at shaping the
behavior
of friends, foes, and neutrals
in peace, crisis, and war*

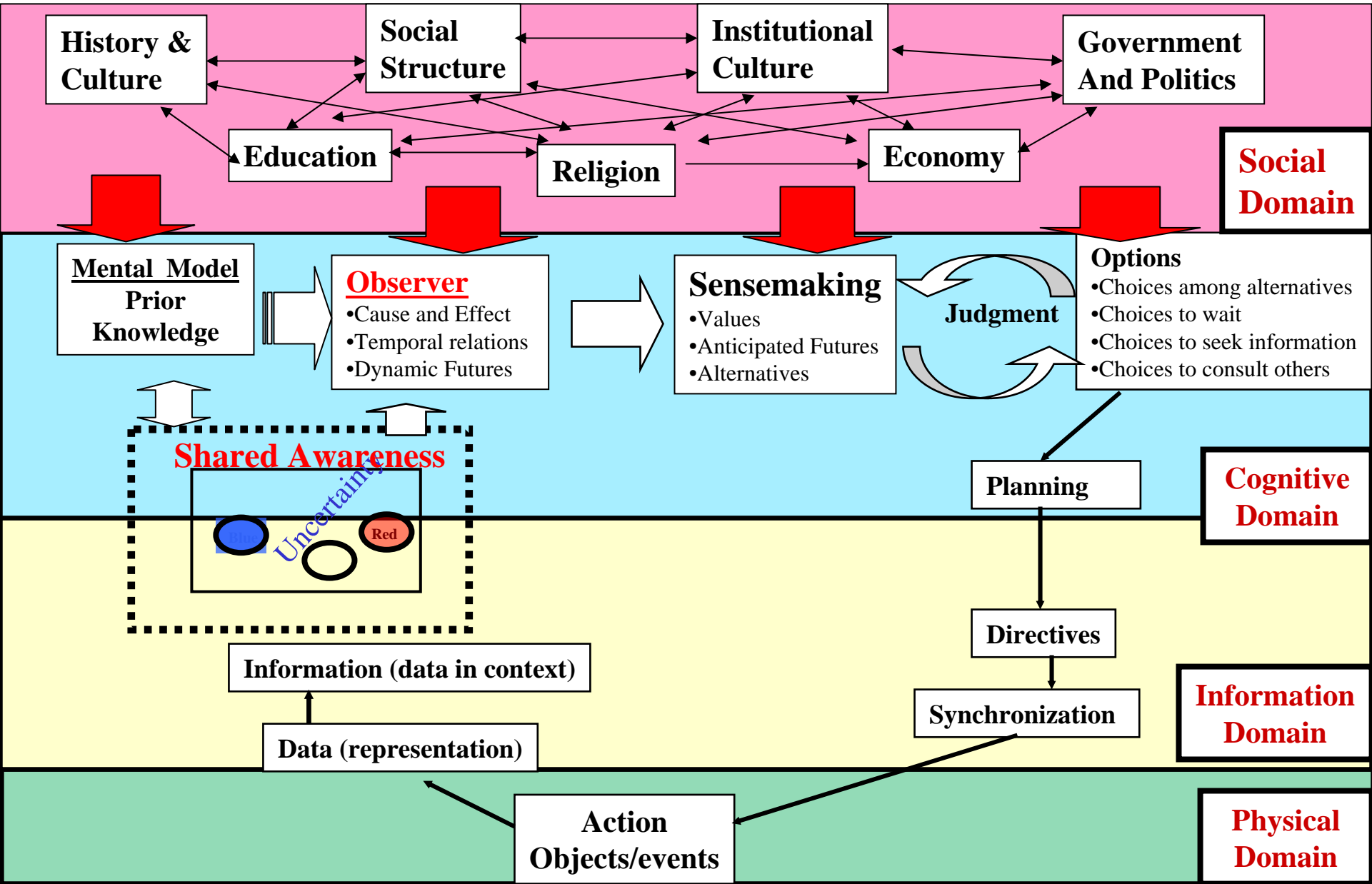
Main US Tracks:

- **Track One:** Effects-based “Targeting”
 - Air Force School
 - Precision strike to create non-linear psychological effects
 - Major combat focus
- **Track Two:** Effects-Based Operations
 - Maneuverist School –Special Forces/ Marine Corps
 - Naval School – Crisis Operations
- **What’s New**
 - Cross spectrum: Peace, crisis, war ...*and* post-conflict stabilization
 - “Whole of nation”
 - Complexity

2. Operations in the Cognitive Domain: *The Action-Reaction-Cycle*



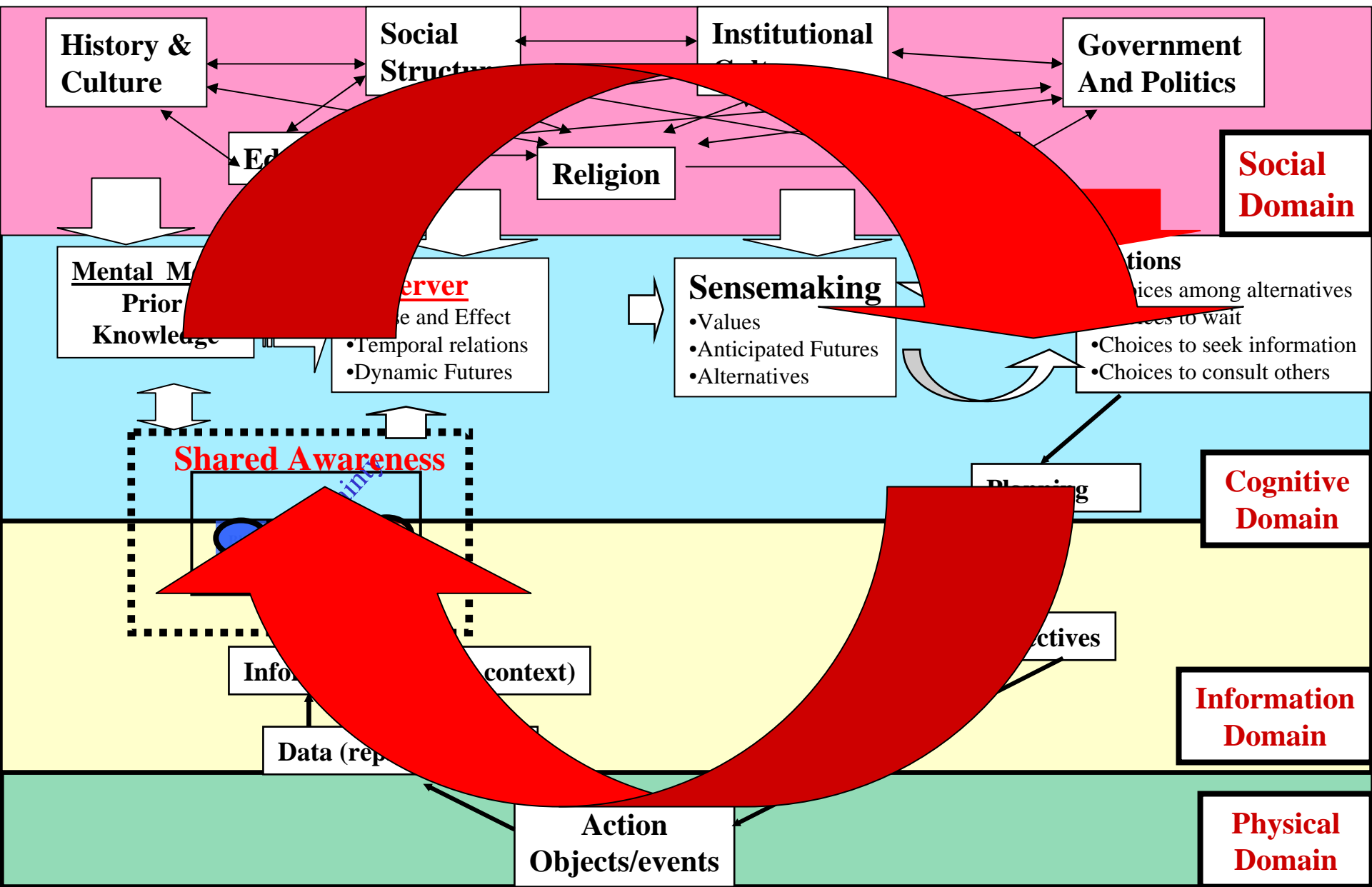
...and Beyond - The Social Domain



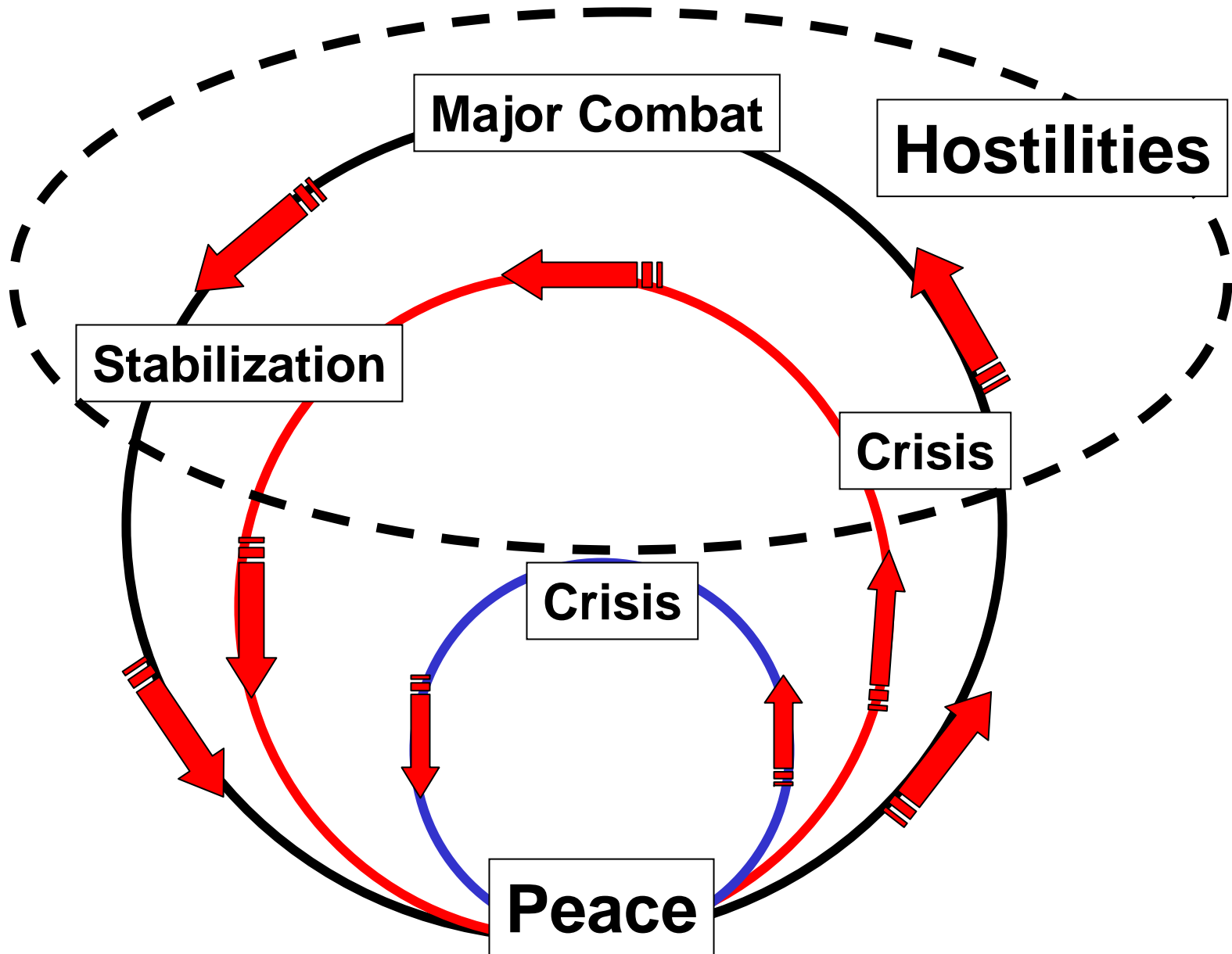
Rules of the Game

- ***Actions* create effects ... on any observer who can see them**
- **Effects occur simultaneously...**
 - ...on four different levels of military operations and
 - ...in political, diplomatic, economic and military arenas
- **Effects are cumulative and interrelated**
- **Effects are physical and psychological**

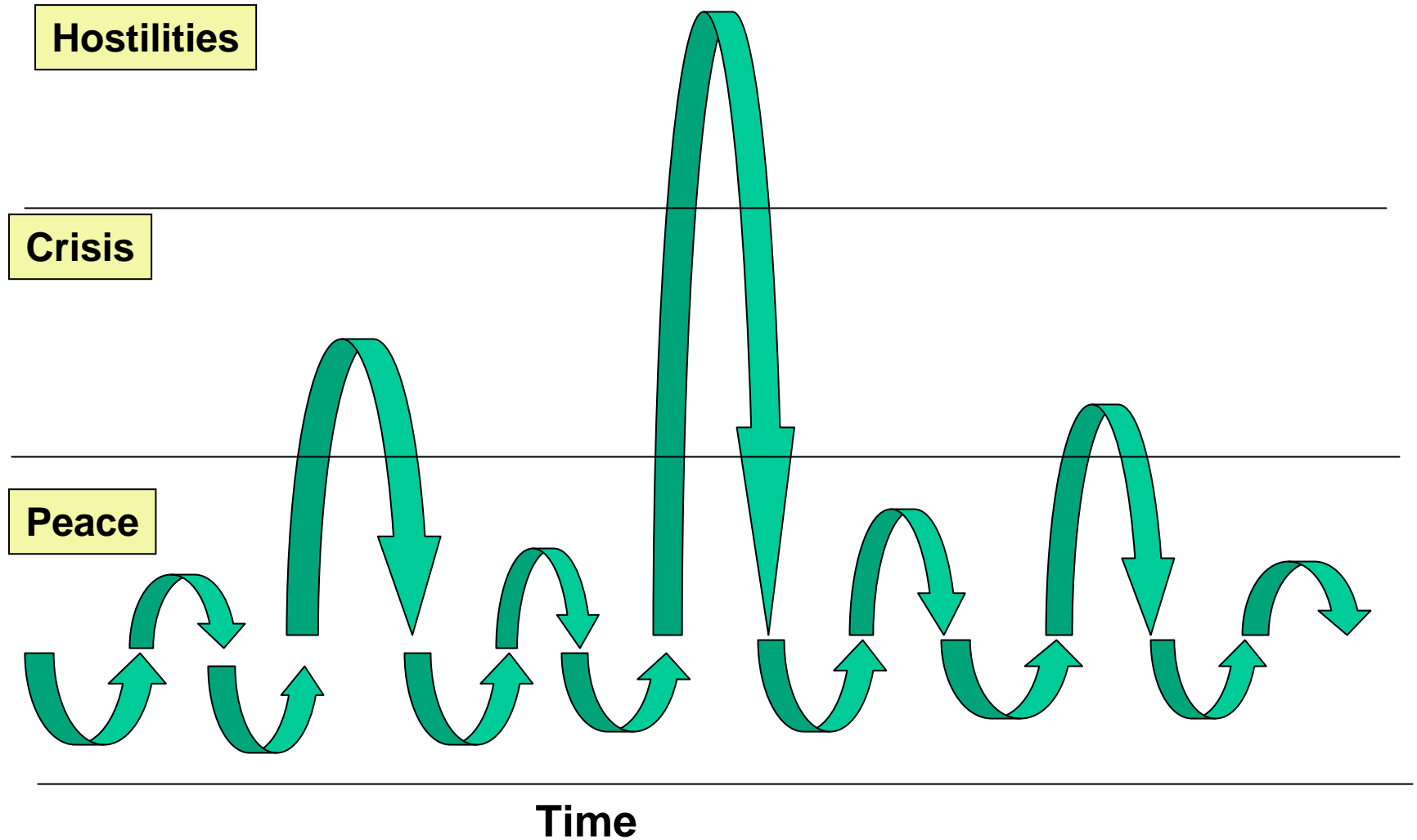
Continuing Action Reaction Cycles



Circular Continuum

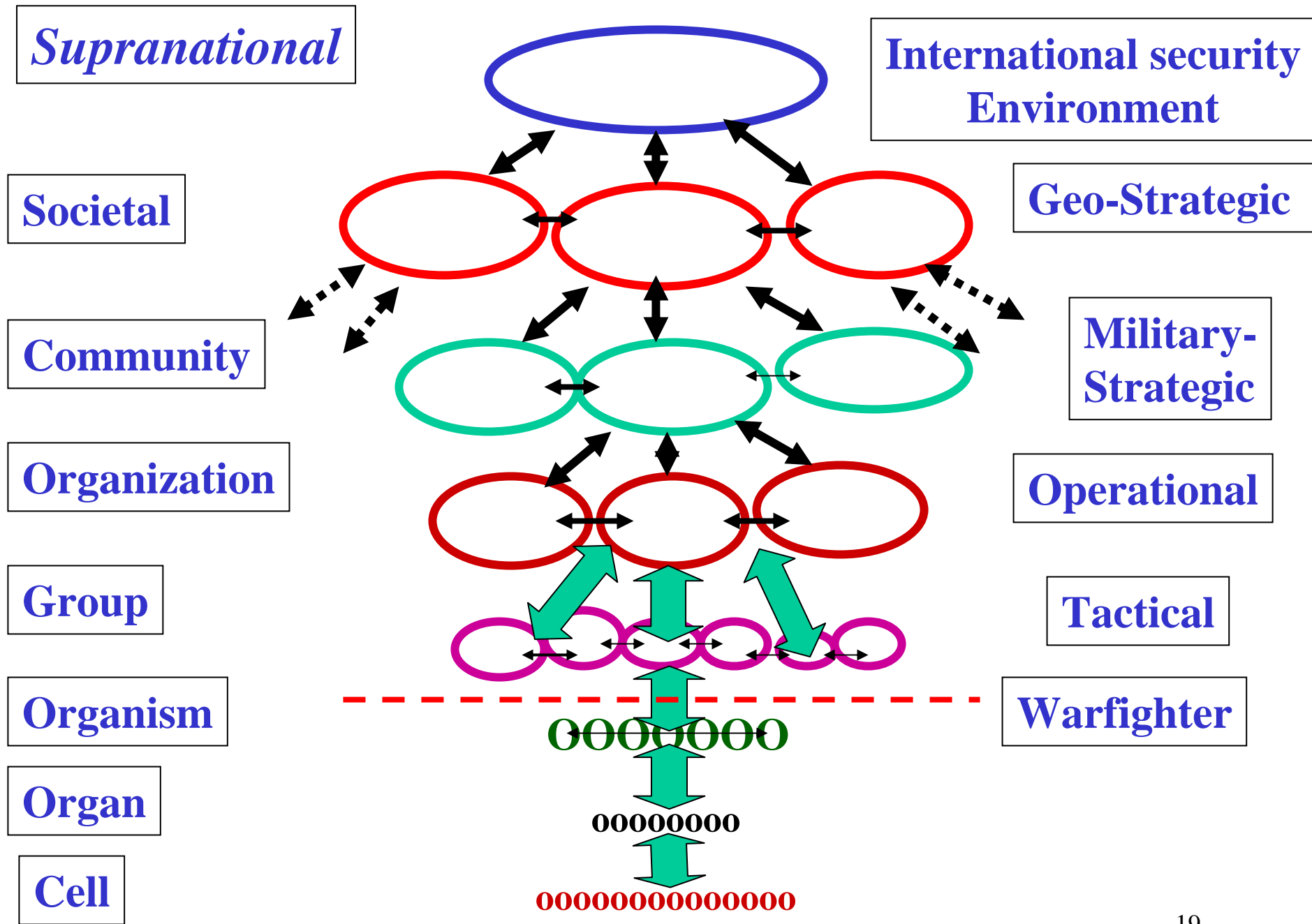


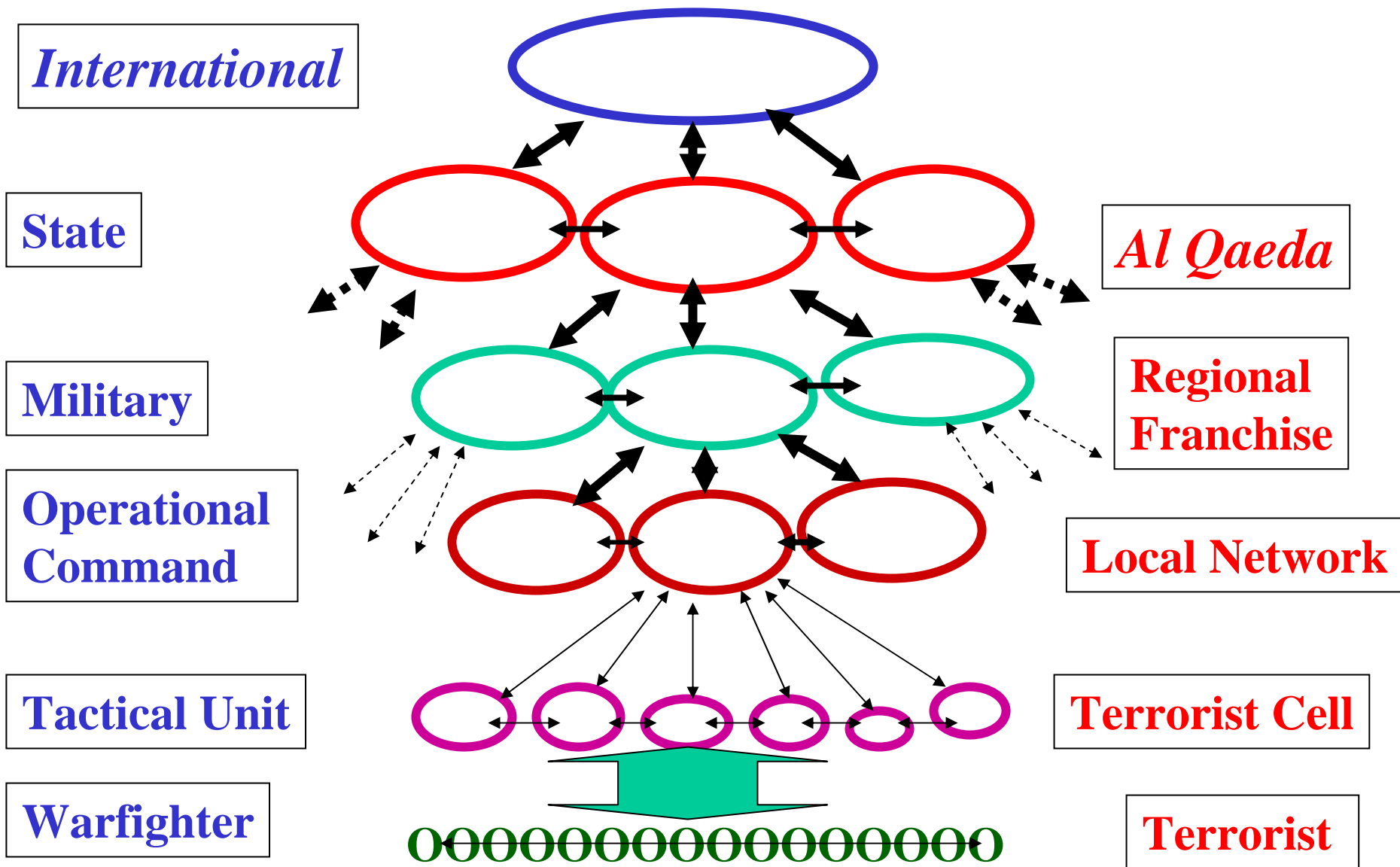
Spiral Continuum



3. Complexity

- **The Complicated**
 - Known or knowable cause and effect chain
 - Inputs/outputs proportional; whole equals sum of parts
- **The Complex**
 - Multiple interdependent variables
 - Changing cause and effect chain
 - Inputs and outputs not proportional; whole does not equal sum of the parts
- **The Complex Adaptive**
 - Not only complex but evolves independently
- **...and The System of Complex Adaptive Systems**





State vs. Non-State Actor

Complexity One: Orchestrating Actions

- **What will they see?**

- Focus

- Force applied

- Scale

- Scope

- Timing

- speed

- duration

- synchronicity

- Visibility

What is done

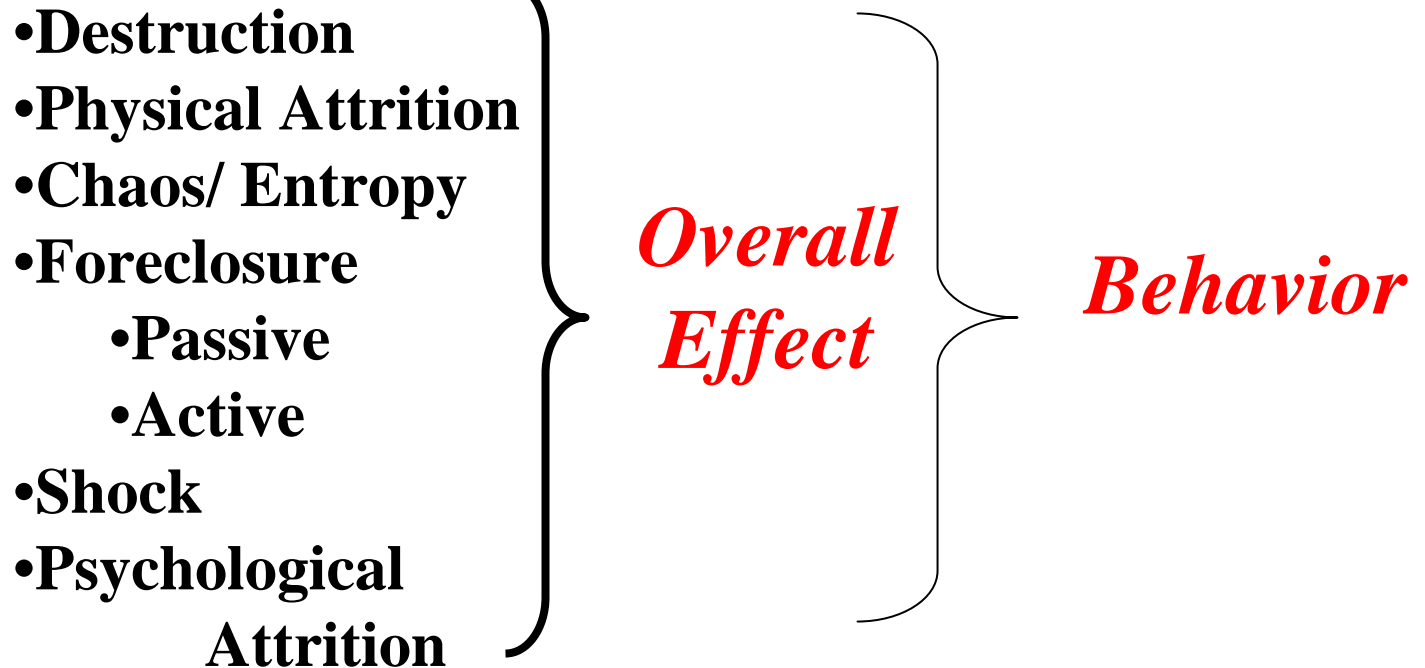
+

How it is done

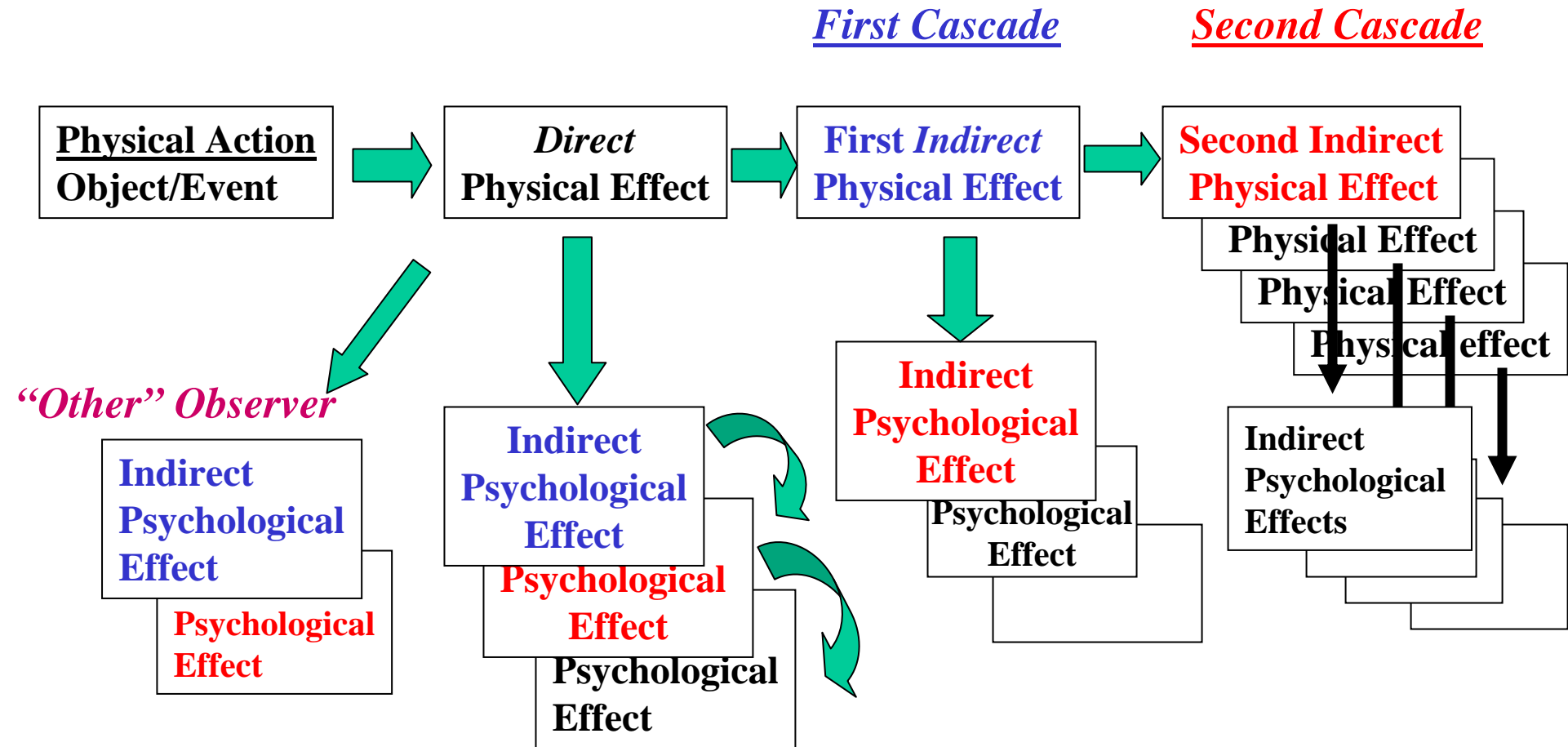
*Tools
For
Shaping*

Complexity Two: Defining Effects

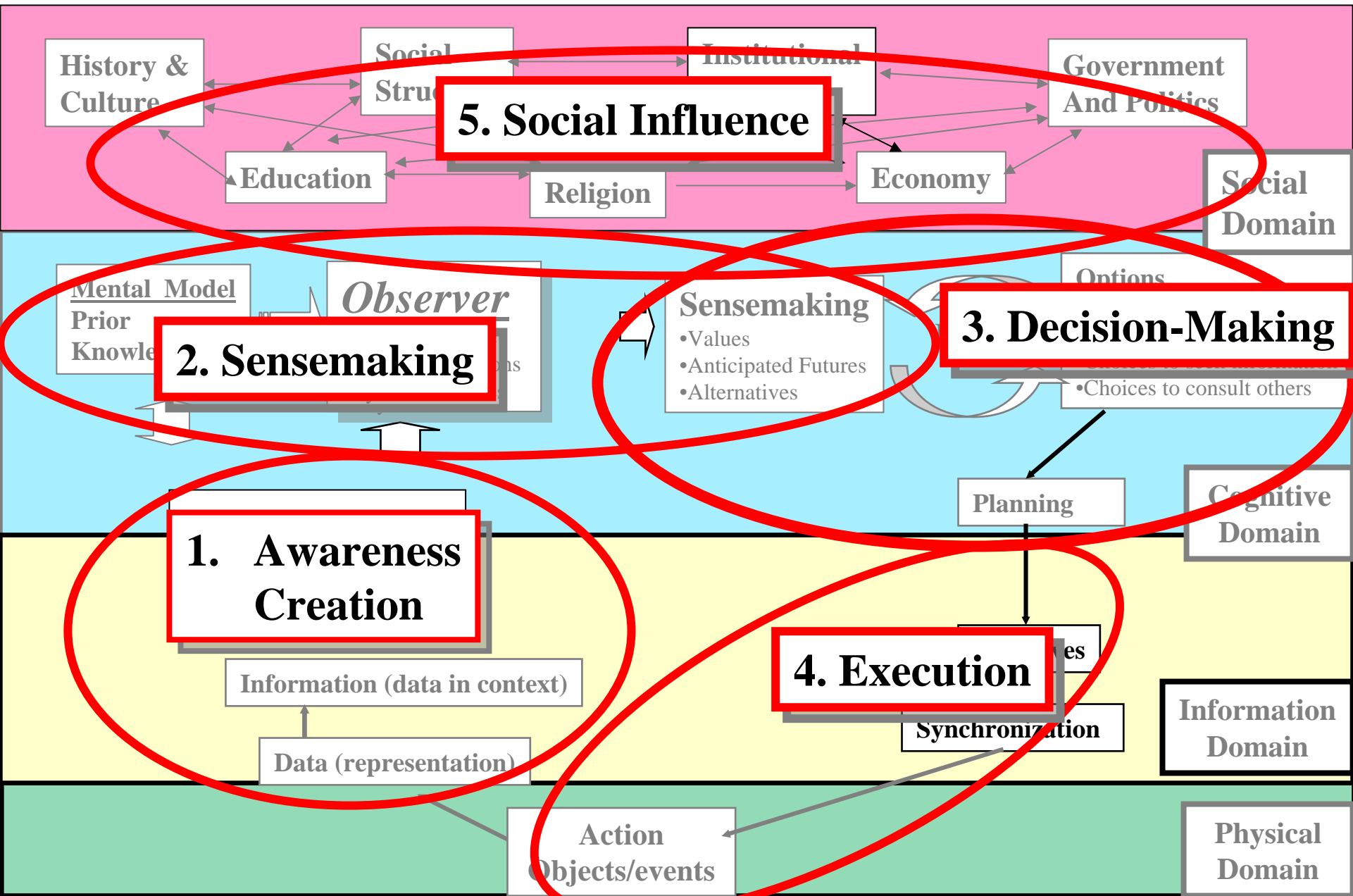
Kinds of Effects

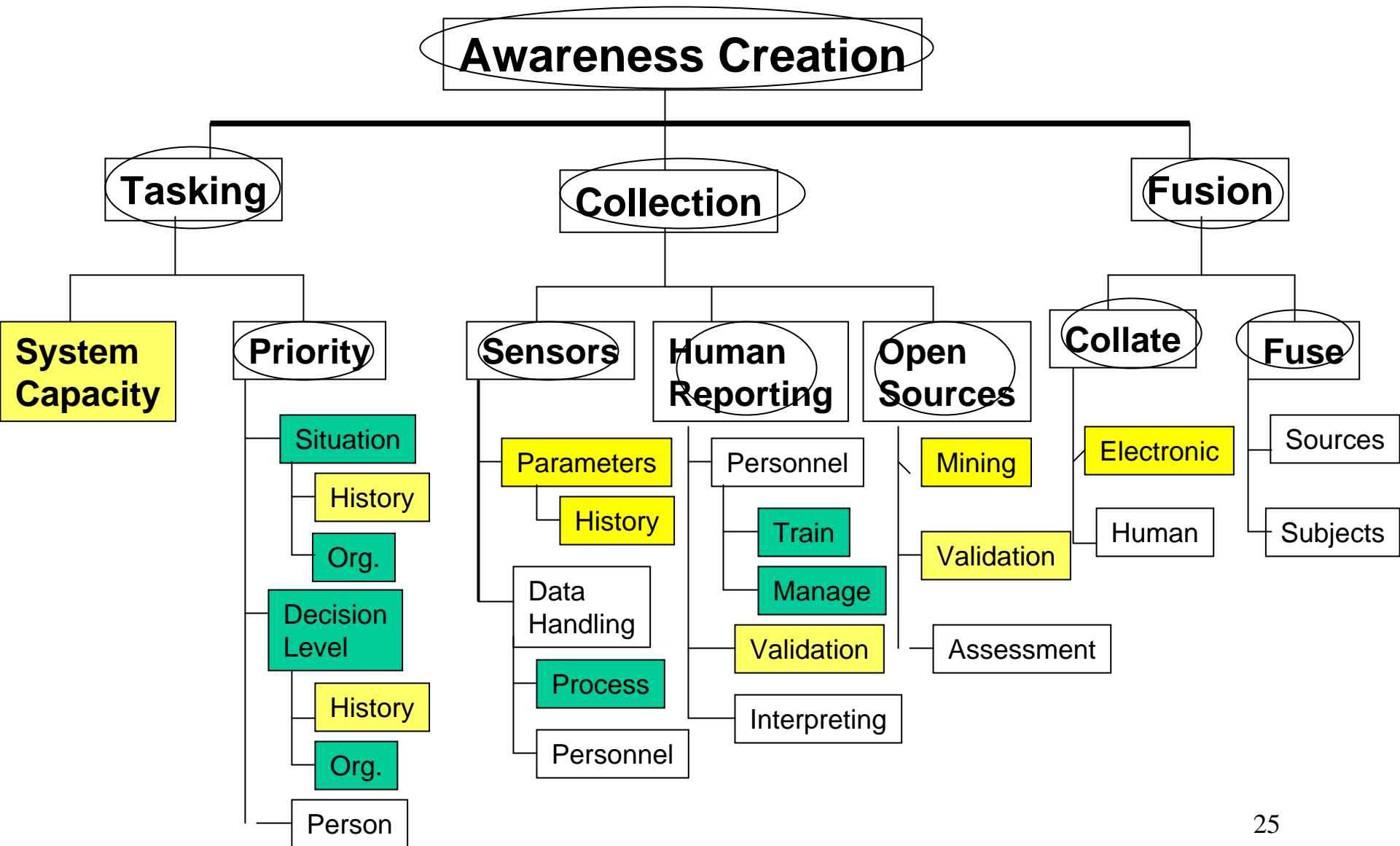


Complexity Three: Effects Cascades



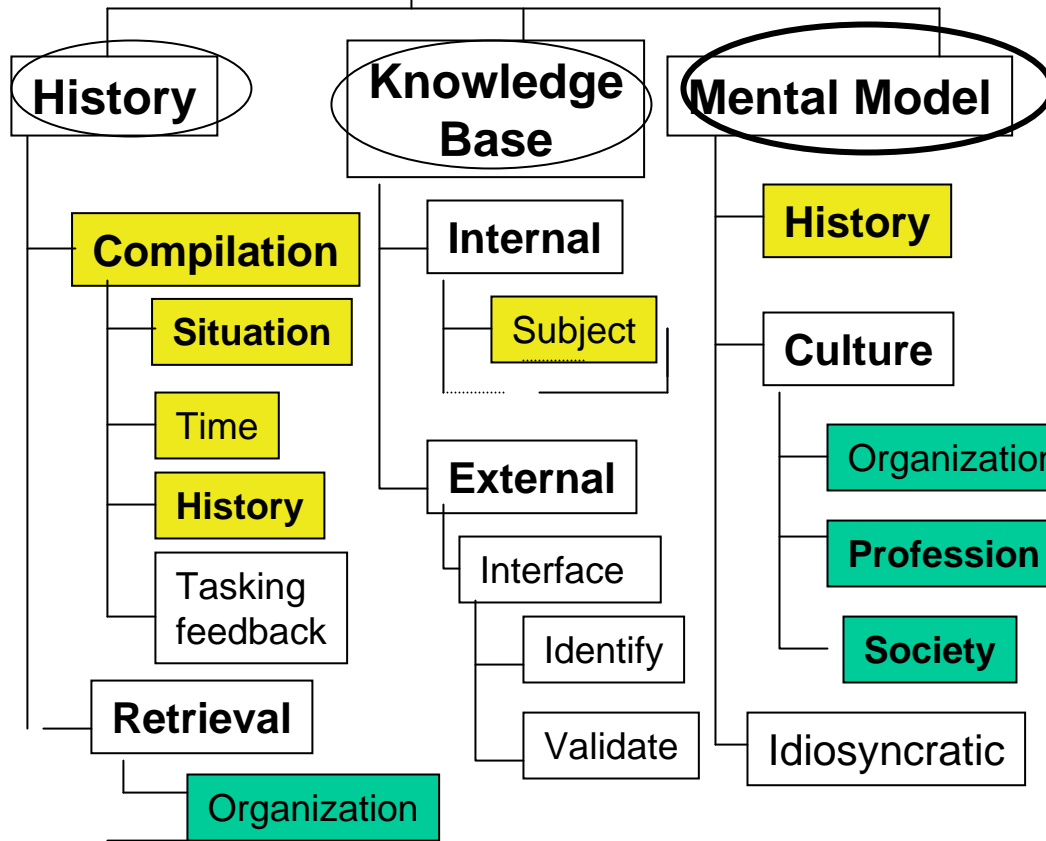
Dealing with Complexity



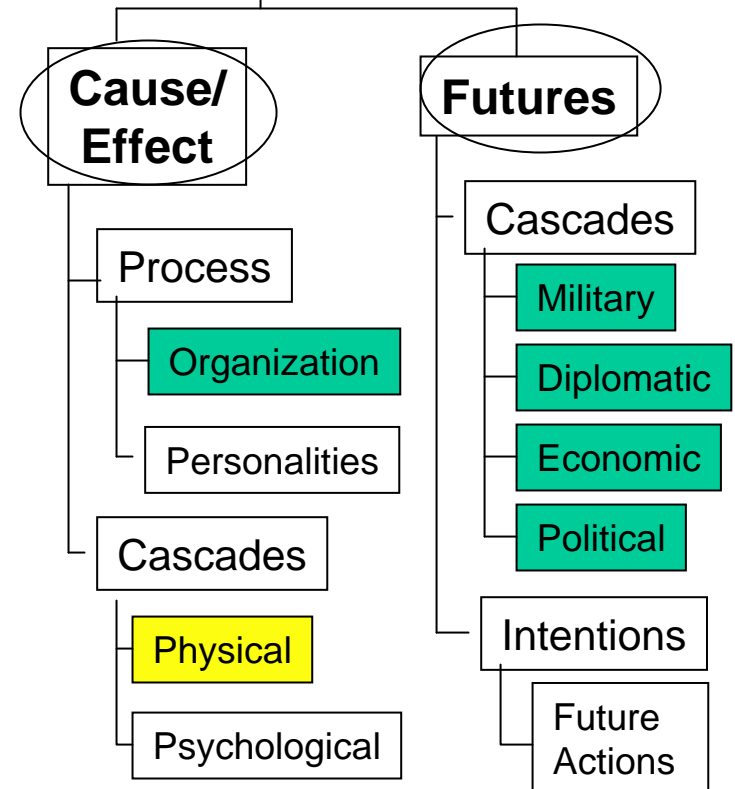


Sensemaking

Contextualization

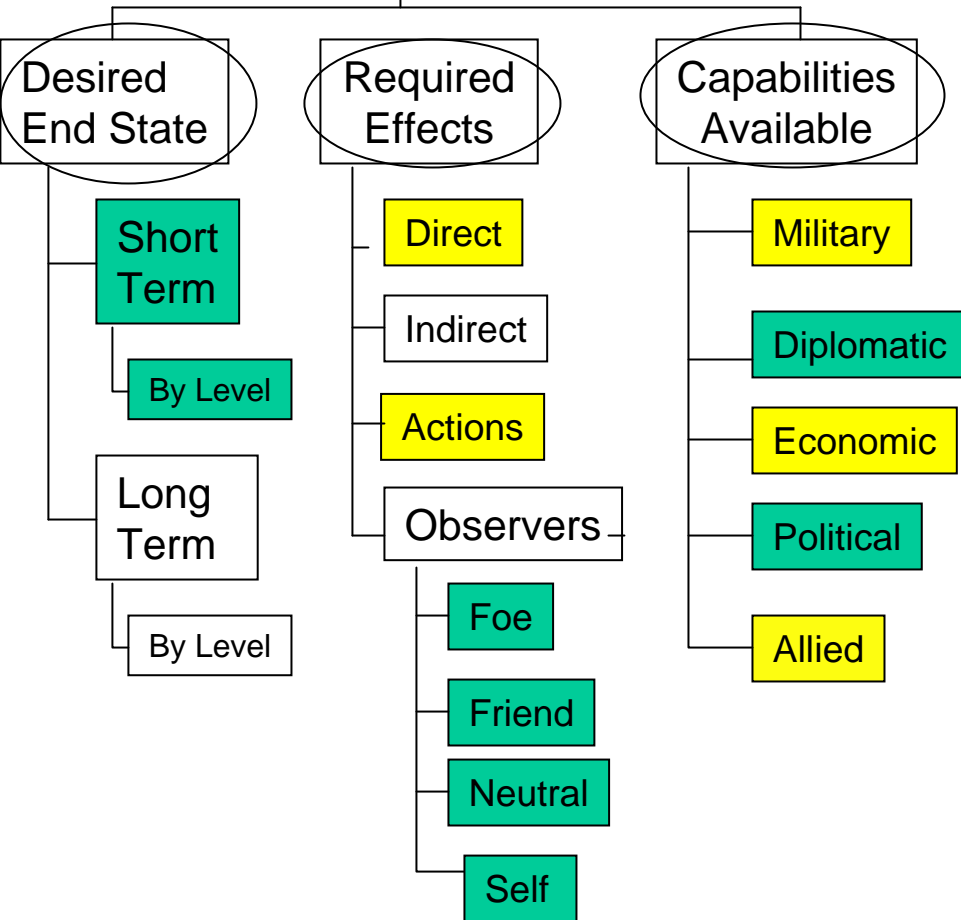


Analysis

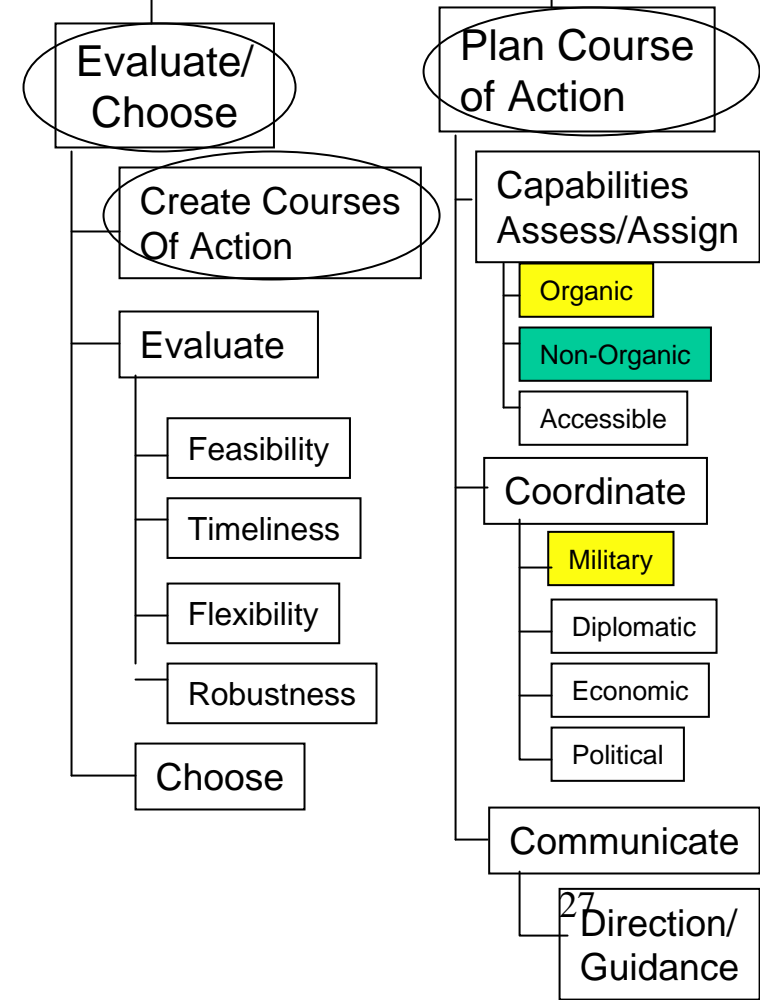


Decision-making

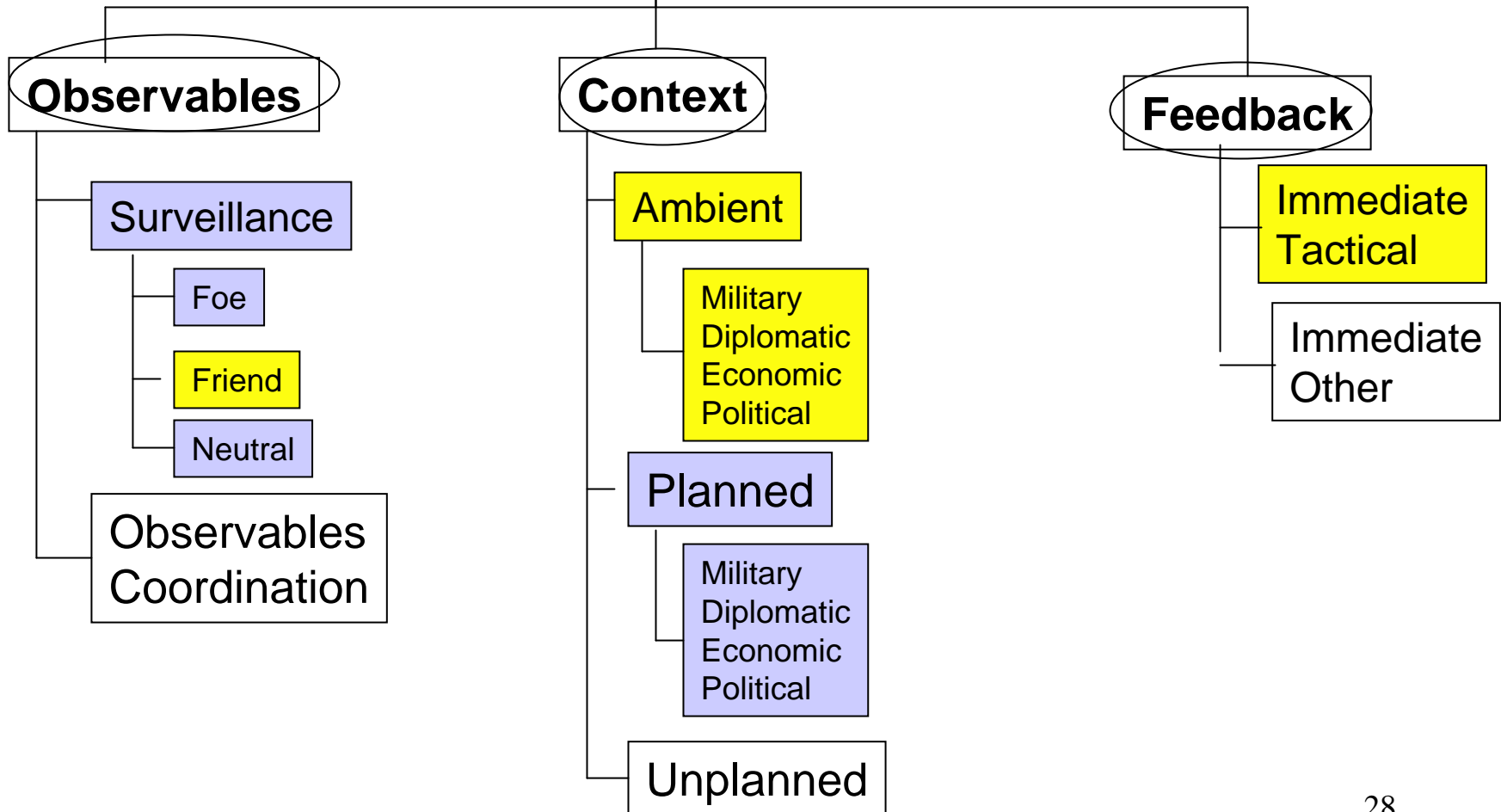
Projected Sensemaking



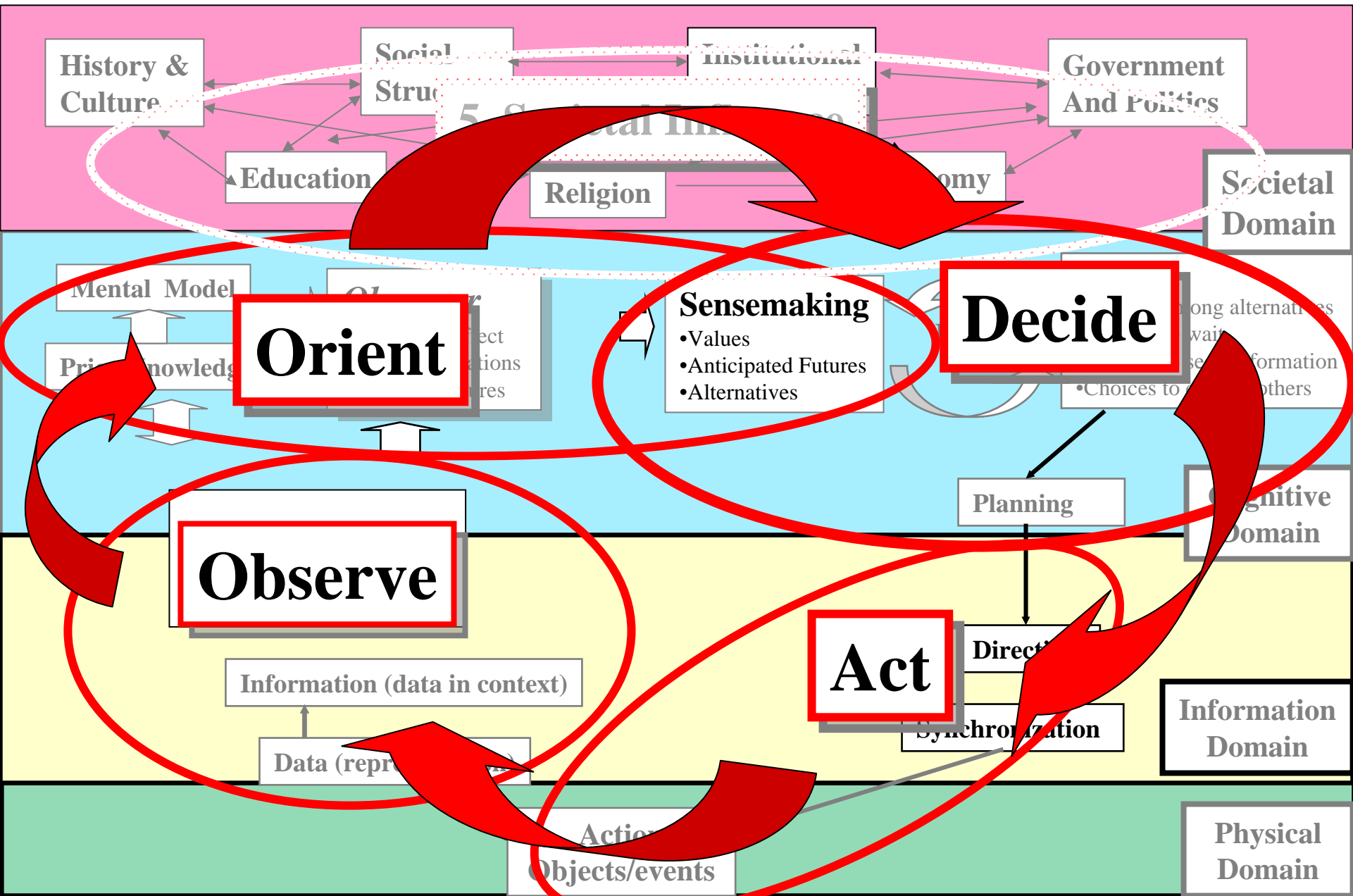
Options Choice/Plan



Execution



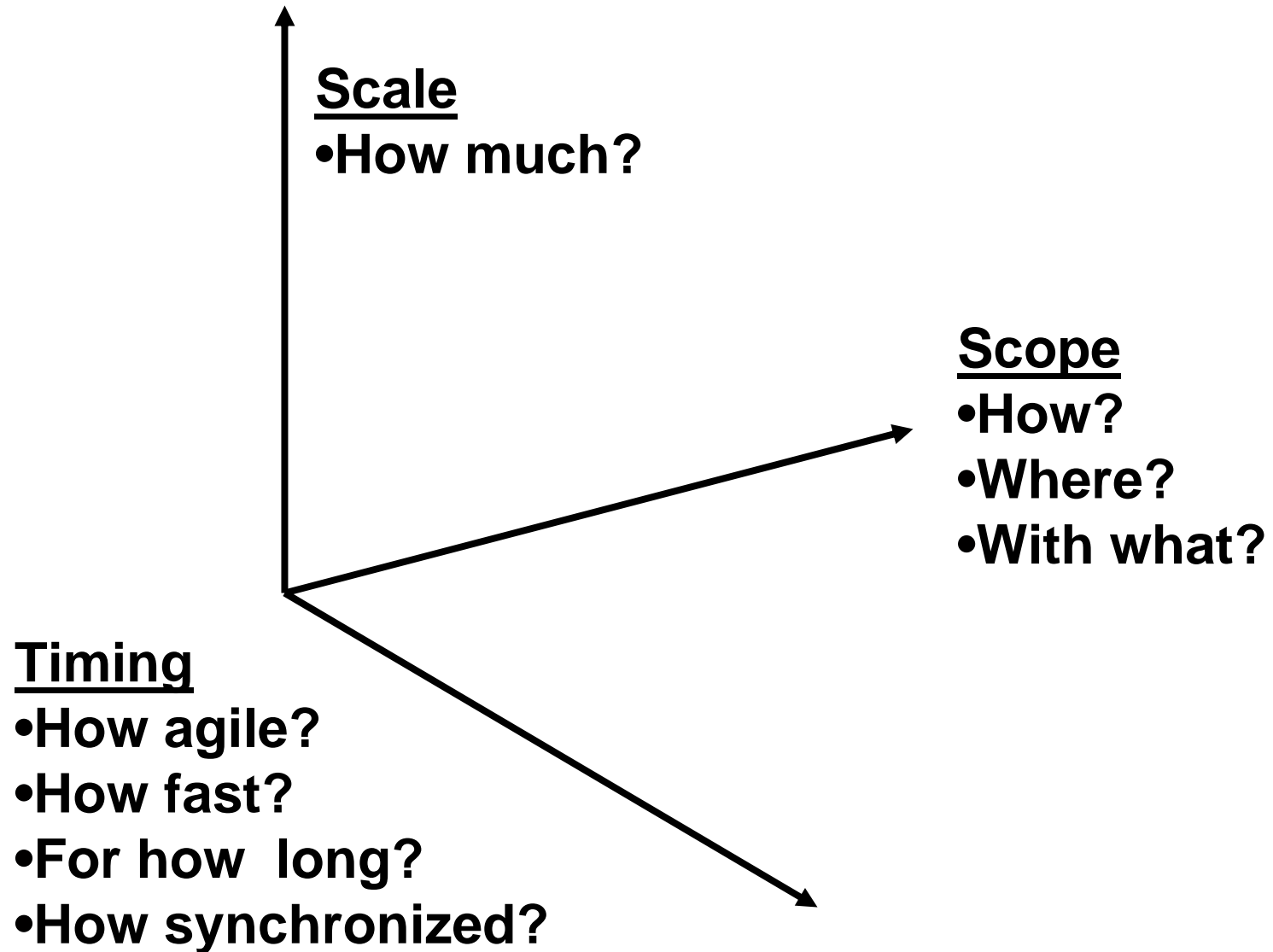
Scalability and Timeliness

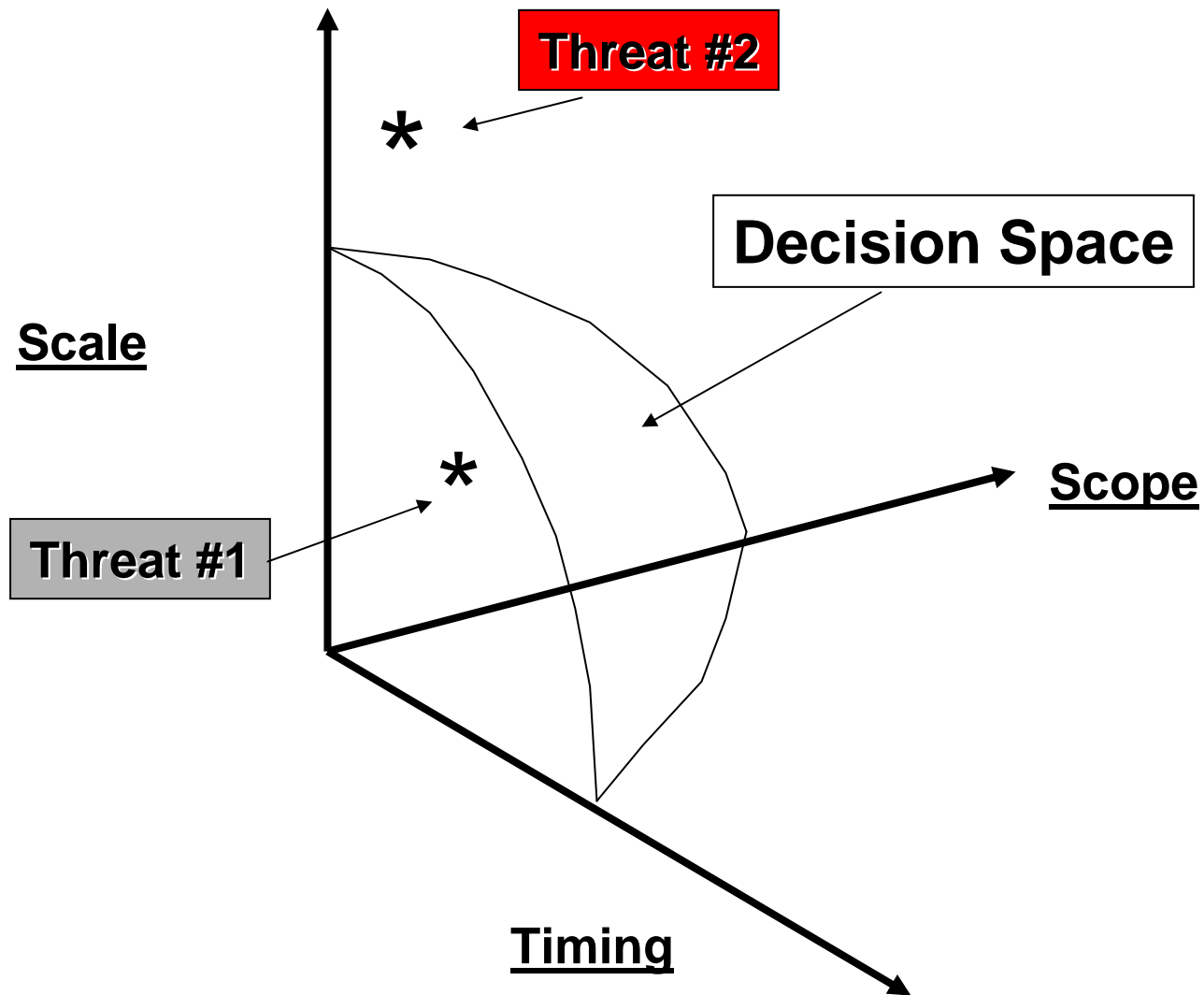


4. Implications for Network Centric Operations

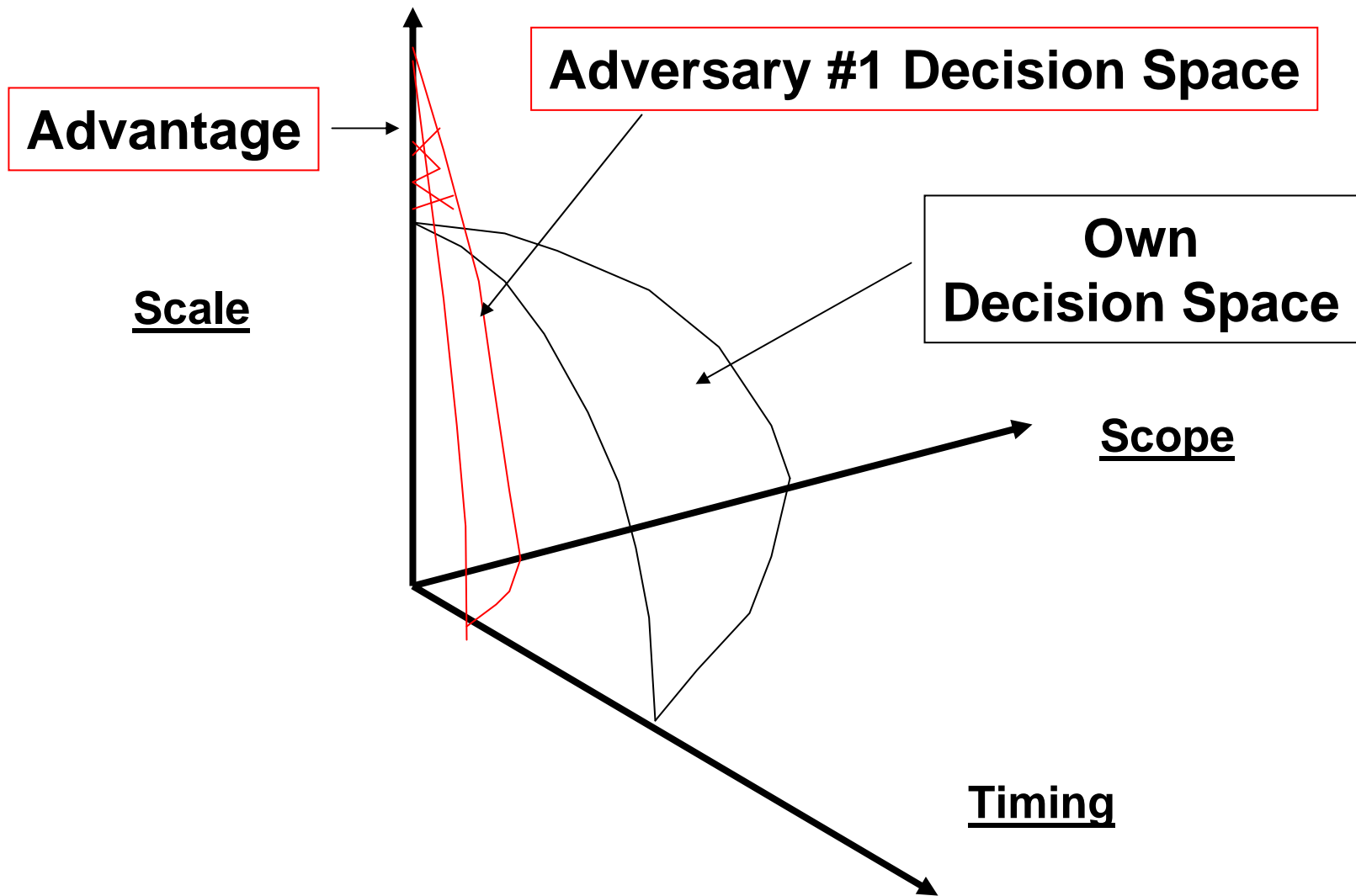
- *Options not answers*
- *Knowledge Mobilization not Data Base Management*
- *Agility and Adaptation not Stock Plans*

Options: Constructing a Decision Space





Competing Decision Spaces



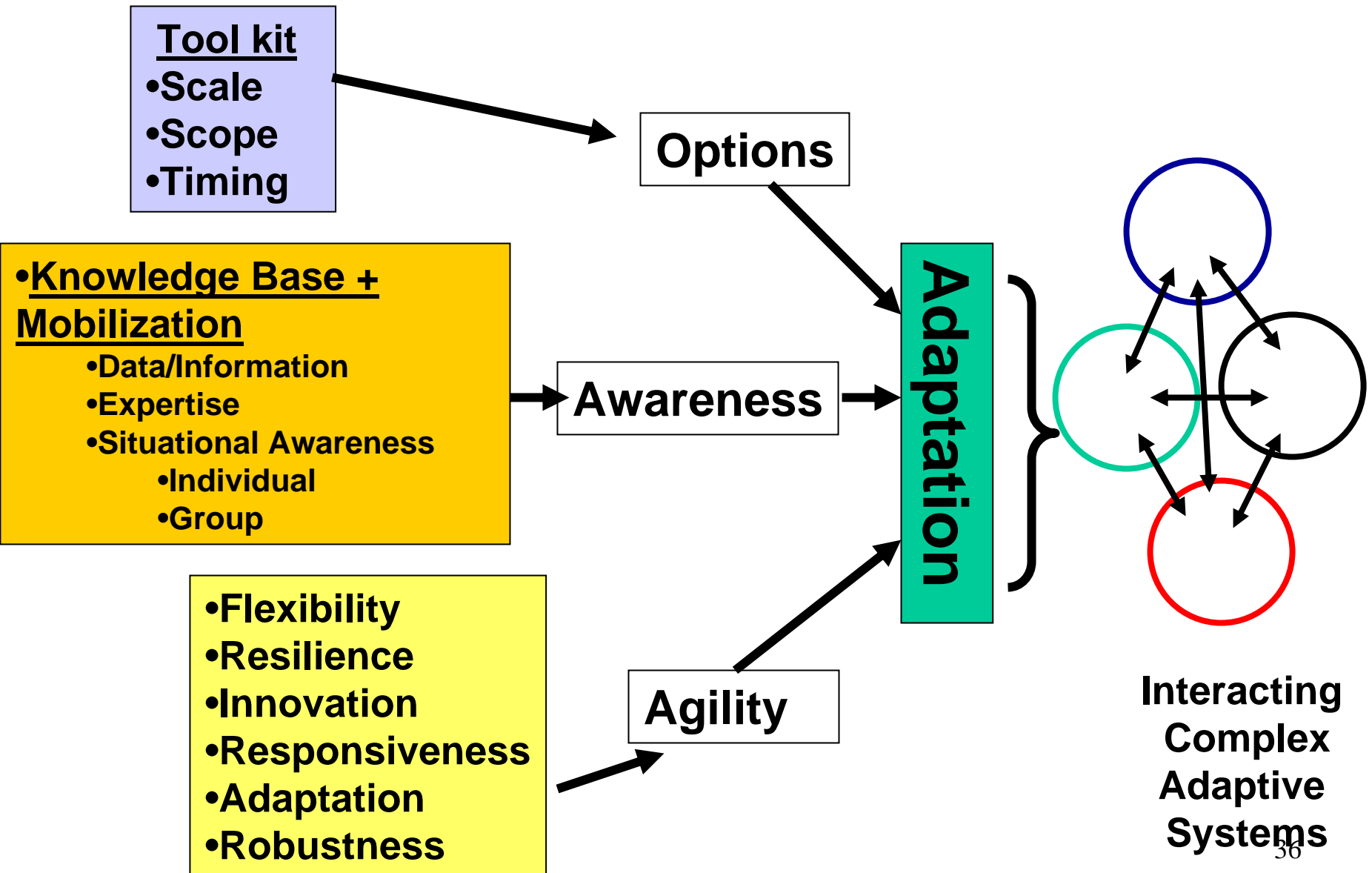
$$C^{(N-1)} \cdot \left(\underset{s}{N} \cdot \underset{c}{N} \right) = \text{Options}$$

- *Capabilities Tool Kit*
- *Social Networking AND Communications Networking*

• Knowledge Mobilization

- **Complex Adaptive Systems**
 - **Cannot entirely predict threat/ problem**
- **Three Different Kinds of Information /Knowledge**
 - **Sensor-derived information**
 - **Human-derived reporting**
 - **Expertise**
- **Three Kinds of Interface**
 - **Machine-Machine**
 - **Man-Machine**
 - **Man-Man**
- **Fusion**
 - **Data, Information, Knowledge**
 - **Ad hoc Communities of Expertise**

• Agility: Putting it Together



Conclusions:

- Complex Security Environment imposes Effects-Based Operations
- EBO imposes move from Networks
 - Faster targeting
 - More efficient attrition ...and
 - “man *out of* the loop”
- To Networking
 - Complex, multi-level, multi-arena responses
 - Social AND Communications Networking
 - Supporting the man in the loop

Second Generation Network Centric Operations

Complexity, Networking, and Effects-Based Operations

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*This paper was received as a PowerPoint
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<http://www.rto.nato.int/abstracts.asp>.

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